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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,956	10/27/2000	Daniel E. Fisher	001.00001	3189

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EXAMINER	
CHOW, CHARLES CHIANG	
ART UNIT	**PAPER NUMBER**
2685	8

DATE MAILED: 08/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No. 09/696,956	Applicant(s) FISHER, DANIEL E.	
	Examiner Charles Chow	Art Unit 2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 08 July 2002 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10/17/2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 6 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

1. Regarding applicant's request for refund, 7/3/2002, the refund was processed on 7/3/2002, for charging $51.00 for small entity. Please contact customer service, at (703) 306-0377, for a refund-check lost in the mail.

Abstract

2. The abstract of the disclosure is objected to because the abstract is too long, near 296 words. Correction is required. See MPEP§ 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.
The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone et al. (US 3,680,124) in view of Puzzo (US 5,255,000).

Regarding **claim 1**, Stone et al. (also as Stone in below) discloses a receiver (figure in cover page, inside the dotted line) comprising RF bridge coupled to dicriminator 99 (figure in cover page) to receive reference signals, 340MC+250-Δf and 340MC- Δf, from frequency

synthesizer 69 (Fig. 7), to mixers 65/67, for computing the phase difference of the received signals A1, A2, emitted from satellite (abstract, figure in cover page; col. 6, line 63 to col. 7, line 18).

Stone discloses the first and second frequency converters (mixers 65 and mixer 67as shown in Fig. 7).

Stone discloses the third frequency converter (linear mixer 71, Fig. 7) coupled to outputs of the first and second frequency converters (mixers 65/67 above).

Stone does not clearly indicate the processor.

Puzzo teaches the processor 84 (Fig. 2; col. 5, lines 19-21) for computing the angle of arrival of the pair of transmission signals using the phase differences from the means for determining the frequencies of the transmission signals and the phase correlating (col. 10, lines 30-34). Puzzo teaches a technique to avoid the common weakness such that the angle of arrival of the signal can be truly measured (col. 1, lines 19-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone, and to include Puzzo's processor for measurement of angle of arrival and frequencies , such that the accurate angle of arrival of a transmitted signal could be computed.

4. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, and further in view of Wachs (US 6,147,640).

In the above, it does not clearly indicate the frequency difference being a difference between frequency of the first and second signals

Regarding **claim 2**, Wachs teaches the system for determining the location and angle of arrival of a interference signal for a communication satellite (title, abstract, figure in cover page, Fig. 4; col. 1, lines 6-12; col. 2, lines 10-60). Wachs teaches the determining of frequency difference for calculating the phase shift (as shown in col. 4, lines 16-46). Wachs teaches the efficient technique for locating a signal source by calculating of the angle of arrival, such that the emitting source can be located. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Wachs 's determining of the frequency difference for angle of arrival, such that the system could efficiently locate the signal source.

Regarding the first and second frequency converters for receiving signals from respective first and second antennas, and the third frequency converter, referring to Stone above in claim 1. Regarding frequency difference modulated onto to the reference signal, Stone discloses the phase comparator 101 (Fig. 7) connected to 200KC IF 83 for modulating the 100KC VCO 105 (Fig. 7; col. 10, lines 50-68; col. 14, lines 19-48) for the frequency synthesizer 69.

5. Claims 4, 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, Wachs, as applied to claim 3 above, and further in view of Kitayoshi (US 6,140,960).

In the above, it does not clearly indicate filter coupled between the fourth frequency converter and the second frequency converter, for a stop band at highest frequency and a pass band at a lowest frequency, with pass band at a shifted frequency.

Regarding **claim 4**, Kitayoshi teaches the estimation the direction of a wave source for generating radio wave hologram observation and display (as shown in title, abstract, figure in cover page; col. 1, lines 11-27; col. 19, line 66 to col. 20, line 36). Kitayoshi teaches the band pass filters 222/223 for two respective signal path as shown in Fig. 12, col. 20, lines 37-62). Kitayoshi teaches the efficient estimating a wave distribution of the signal source (col. 6, lines 45-51), such that the size of the signal source can be efficiently estimated. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Kitayoshi's band pass filters for estimating of the signal source, such that size of the signal source could be efficiently estimated.

Regarding **claim 7**, referring to claims 1, 6 above for: a frequency converter coupled to the first and second frequency converter

Regarding **claim 8**, referring to claims 2, 6 above for: the RF bridge the filter coupled between the third converter and second converter; stop band at highest frequency with a pass band; and a lowest cutoff frequency from the band pass filters 222/223 of Kitayoshi above.

6. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, as applied to claim 1 above, and further in view of Adams et al. (US 4,717,916).

In the above, it does not clearly indicate the digital frequency source.

Regarding **claim 9**, Adams et al. (also as Adams in below) teaches the digital source to generate a reference signal based on the signal from a clock source and the reference being coupled to the RF bridge. Because Adams teaches the G(t) 368 signal from processor 370 (Fig. 26-27) for the high resolution Doppler interferometer (abstract, col. 1, lines 6-10; col. 5, line 50 to col. 6, line 52; col. 36, lines 25-49). Adams teaches the technique for the locating a target with the high resolution image (col. 5, lines 43-57), such that the target can be located accurately. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Adams's G(t) correction signal for locating a target, such that target can be accurately located.

In the above, it does not clearly indicate the second center frequency of the second fourier transfomer.

Regarding **claim 10**, Adams et al. (also as Adams in below) teaches the second fourier transformation using the window function multiplier WFM for signals (xB1-yB2) from receiver B 340 and the antenna B 334 (figure in cover page), other than the first fourier transformation of the signals from receiver A 338. Adams teaches the fourier transformation for signals xB1-yB2 having a corresponding second center frequencies, fB1/fB2 (figure in cover page). Adams teaches the high resolution target source locating and interferometer (abstract), such that the target can be accurately located. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Adams' second window function multiplier, such that the target could be accurately located.

Regarding **claim 11**, referring toe claims 1, 10 above for: the digital frequency generator G(t) for the first digital signal (fA1/fA2 at receiver A output, figure in cover page, and corresponding description in specifications) at first center frequency, coupled to the first fourier transformation using WFM (figure in cover page); and second digital signal (fB1/fB2 at receiver B, figure in cover page) at second center frequency, coupled to the second fourier transformation using another WFM (figure in cover page).

7. Claims 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, Adams, as applied to claim 10 above, and further in view of Maitre (US 4,903,030).

In the above, it does not clearly indicate the frequency discriminator coupled to the fourier transfomer.

Regarding **claim 12**, Maitre teaches the frequency discriminator 27 (figure in cover page) is coupled to the frequency analysis 26 (figure in cover page), for the detecting of angular discrimination of targets by airborne radar (abstract; Fig. 1-3; col. 1, line 11 to col. 24). Maitre teaches the Doppler frequencies can be selected with extreme precision for the very fine angular discrimination (col. 1, lines 41-45), such the angle of signal arrival from target can be very finely measured. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Maitre' discrimintor coupled to frequency analysis, such that the angle of signal arrival could be accurately measured. Regarding the first and second fourier transformation, referring to Adams above.

Regarding **claim 13**, referring to claims 1, 2, 10 above for: the circuitry to detect including fourier transformers; the digital frequency generator further generates a third digital signal, to cause frequency shift.

Regarding **claim 14**, referring to claims 1, 9 above for: the first and second frequency converter; the third frequency converter coupled to the first and second RF frequency converters.

Regarding **claim 15**, referring to claims 1, 2, 14 above for: the first and second frequency converter; the third RF frequency converter; the frequency difference signal from output of liner mixer 71 (Stone) is further modulated by frequency 50 MC at mixer 75 (Stone).

Regarding **claim 16**, referring to claims 1, 2, above for: the method for capture a frequency difference; the analyzing the information to determine frequency difference.

Regarding **claim 17**, referring to claims 11, 16 above for: the step of analyzing by forming a first fourier transform and second fourier transform.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Puzzo, Wachs, Adams, as applied to claim 11 above, and further in view of Smith et al. (US 3,789,410).

In the above, it does not clearly indicate the range determination.

Regarding **claim 20**, Smith et al. (also as Smith in below) teaches a system for determining of a ranging by utilizing two antennas, having range indicator for aircraft (Fig. 1-5; abstract, figure in cover page; equation in col. 2, line 1; calculating range using phase-rate col. 2, lines

52-62). Smith teaches the accurate determination of range, frequency, and antenna orientation using phase rate ranging system (col. 1, lines 6-32), for accurately determining of the range information for aircraft. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Stone above, and to include Smith's range determination, such that the system could accurately determine the range information.

Claims Objection

9. Claims 3, 5, 6, 18, 19, 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding **claims 3, 6**, the prior arts does not clearly teach the fourth converter coupled to the reference and also coupled between the frequency source and the second frequency converter, although Stone discloses in above the mixer 123 (Fig. 7) coupling to the reference frequency source 100 KC (Fig. 7).

Regarding **claim 5**, the prior art does not teach an upconverter coupled between the processor and the RF bridge to frequency translate the reference signal by a predetermined frequency into an intermediate reference signal coupled to the RF bridge, although Farmer teaches the upconversion of IF source 26 by utilizing direct digital synthesizer 24 and direct reference oscillator 20 (Fig. 2). Regarding **claim 18**, the prior art does not teach the integration interval is inversely proportional to a difference between the first and second center frequency. Regarding **claim 19**, the prior art does not teach the frequency difference to be $\pi/2T * (A-B)/(A+B)$.

Conclusion

10. In the above disclosures, Stone discloses the a receiver comprising RF bridge coupled to dicriminator 99, having reference signals, 340MC+250-Δf and 340MC- Δf, from frequency synthesizer 69, to mixers 65/67, for computing the phase difference of the received signals A1, A2, emitted from satellite (abstract, figure in cover page; col. 6, line 63 to col. 7, line 18). Stone discloses the first and second frequency converters, mixers 65 and mixer 67as shown in Fig. 7. Stone discloses the third frequency converter, linear mixer 71, coupled to outputs of the first and second frequency converters.

Puzzo teaches the processor for measurement of angle of arrival and frequencies.

Wachs teaches the determining of the frequency difference for angle of arrival.

Kitayoshi teaches the band pass filters for estimating of the signal source.

Adams teaches the G(t) correction signal for locating a target.

Maitre teaches the discrimintor coupled to frequency analysis.

Smith teaches the accurate range information determination using phase rate ranging system.

11. The cited pertinent prior arts are listed below:

A. US 5,594,452, January 1997, Webber et al. teaches *the system for locating an unknown transmitter using calibrated oscillator phase (as shown in title, abstract, Fig. 1-6; col. 1, lines 7-12; col. 2, line 31 to col. 3, line 35).*

B. US 3,697,997, October 1972, Cooper teaches *the interferometer for navigation system for determining of the angle of arrival of the signals at two antennas for aircraft (title, abstract, Fig. 1-8; col. 1, lines 6-22; col. 1, line 51 to col. 2, line 23).*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Chow whose telephone number is (703)-306-5615.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (703)-305-4385.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Charles Chow

Charles Chow

July 28, 2002.